Tokens in the Tower: Perceptual Processes and Interaction Dynamics in Academic Settings with 'Skewed', 'Tilted' and 'Balanced' Sex Ratios

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Tokens in the Tower: Perceptual Processes and Interaction Dynamics in Academic Settings with 'Skewed', 'Tilted' and 'Balanced' Sex Ratios

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We tested Kanter's (1977a, 1977b) theory concerning the effects of group proportions (sex ratios) on visibility, polarization and assimilation, using natural groups of women and men in academia. Study 1 compared male-skewed and male-tilted settings and found evidence of greater polarization by minority women than majority men. The only effect of group proportions occurred for perceived dispersion as a measure of assimilation; replicating Brown and Smith (1989), men showed an out-group (OH), and women an in-group (IH), homogeneity effect, and both effects were accentuated in the skewed setting. Study 2 extended the research to include male-skewed, male-tilted, balanced and female-tilted sex ratios. Men's OH effect declined as relative out-group size increased, and women's IH effect declined as relative in-group size increased. There was also a linear decrease in relative perceived in-group impact and status as actual relative in-group

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size declined. We discuss our findings with respect to the validity of Kanter's theory, gender and group size as moderators of perceived variability, and methodological issues in studying diversity.

KEYWORDS gender, group size, in-group homogeneity, out-group homogeneity, perceived variability, sex ratios, tokenism

WOMEN in the US Senate and House of Representatives, the Marylebone Cricket Club, the Vienna Philharmonic, the Board of a Fortune 500 Company and the academic senate of every British university all have something in common: they are members of a tiny minority. The existence of such skewed groups is immediately obvious in cases where women are referred to as hyphenated group members (e.g. 'woman engineer', 'female professor').

Kanter (1977a, 1977b) was the first to study the impact of relative group proportions, especially skewed sex ratios, on group phenomena. Kanter (1977b) carried out a qualitative case study of 20 saleswomen in the 300-person sales force of a multinational corporation and concluded that, 'The life of women in the corporation was influenced by the proportions in which they find themselves' (p. 207). The enduring influence of her work is reflected in half the chapters of the recent edited volume on *Discrimination at work: The psychological and organizational bases* (Dipboye & Colella, 2005).

Kanter distinguished four group types based on the proportions of majority and minority groups, varying from 'uniform' (e.g. all group members are men), through 'skewed' (e.g. a huge majority of men are the 'dominants', and a tiny minority of women are 'tokens'), 'tilted' (e.g. a large 'majority' of men and a 'minority' of women) and 'balanced'. Kanter was especially interested in skewed settings, and she proposed that token women's proportional rarity was associated with three 'perceptual phenomena' ('visibility', 'polarization' and 'assimilation') and three parallel 'interaction dynamics' ('performance pressures', 'group-boundary heightening' and 'role entrapment'). The majority of relevant studies have focused on gender diversity issues, but tokenism can also apply to other variables of 'relational demography' (Riordan, Schaffer, & Stewart, 2005), including race and ethnicity (e.g. Jackson, Thoits, & Taylor, 1995; Pettigrew & Martin, 1987).

Kanter's theory of group proportions

'Visibility and performance pressures' refer to the fact that tokens are highly visible, receive more attention than dominants, and hence feel 'different' (cf. Milliken & Martins, 1996; Taylor, 1981). This awareness of difference leads to performance pressures for tokens who must both act for themselves and represent their category. It can adversely affect their performance in work groups (e.g. Lord & Saenz, 1985), increase their perceptions of vulnerability (Niemann & Dovidio, 1998), and decrease feelings of comfort (Bourhis, 1994) and job satisfaction (Mellor, 1996; Milliken & Martins, 1996; Yoder, 1994). 'Polarization and group-boundary heightening' refer to the contrast drawn between tokens and dominants, which might be reflected in negative perceptions of the relations between the two groups. The presence of the tokens can lead to dominants' exaggerating both their within-group commonalities and differences between the two gender groups. This overgeneralization leads to a tightening of group boundaries, as dominants emphasize their culture and remind tokens of their difference, isolating tokens from informal, social and professional networks. Finally, 'assimilation and role entrapment' refer to the fact that tokens' personal characteristics tend to be distorted to fit the generalized view of members of the category, and the target of these processes is forced to confirm the perceiver's stereotype. These processes are evident when a token woman is mistaken for another member of her category, treated as though she resembles women on average, and forced to play a gender-stereotypical role (trapped in her gender role). This experience can reduce job satisfaction and be a source of stress (see Kanter, 1977a, pp. 283–284).

There is extensive evidence that token women suffer in some of the ways Kanter

predicted, whether as the first policewomen on patrol (S E. Martin, 1980; Ott, 1989), women academics (C. J. Young, Mackenzie, & Sherif, 1980), women enlisted in the armed forces (e.g. Rustad, 1982), women on workers' committees in Israeli firms (Izraeli, 1983), women physicians (Floge & Merrill, 1986), or the first women to serve as corrections officers in men's prisons (Jurik, 1985). Token women are especially likely to report being the target of stereotyping and discrimination (e.g. Beaton & Tougas, 1997; Floge & Merrill, 1986; Johnson & Schulman, 1989; Yoder, Adams, Grove, & Priest, 1985), being perceived as physically weak (Yoder, Adams, & Prince, 1983), and being seen to lack leadership qualities (Ott, 1989).

In short, compared with women in more balanced settings, minority women in male domains experience greatest prejudice and discrimination (Nieva & Gutek, 1981; see also Eagly, Makhijani, & Klonsky, 1992; Eagly & Mladinic, 1994). These negative effects are typically magnified in the case of 'solos' (either single members of the minority, or very small minorities), who are especially likely to suffer from being perceptually distinct and the source of attention (see Heilman, 1980; Taylor, 1981). Critics have, however, identified a number of key limitations to Kanter's theory and associated research (see Yoder, 1991, 1994), much of which has described a skewed group, rather than comparing the experience of members in groups of varying proportions (for exceptions, see Dworkin, Chafetz, & Dworkin, 1986; Izraeli, 1983; Ott, 1989; South, Bonjean, Markham, & Corder, 1982; Spangler, Gordon, & Pipkin, 1978). The most damaging critiques refer to Kanter's confounding numerical proportions with three other factors— (gender) status, occupational inappropriateness and intrusiveness.

Status is typically confounded with gender (see e.g. Eagly, 1987; Geis, 1993; Ridgeway & Diekema, 1992; Ridgeway & Smith-Lovin, 1999). Relatedly, several studies have shown that token men (e.g. male nurses: Floge & Merrill, 1986; Fottler, 1976; Ott, 1989; male school teachers: Dworkin et al., 1986) avoid the negative consequences of numerical imbalance (e.g. Fairhurst & Snavely, 1983a, 1983b). In fact, visibility may have no effect on men (Sackett, DuBois, & Noe, 1991) or even confer advantages such as enhanced promotional opportunities (e.g. Grimm & Stern, 1974; Heikes, 1991; Ott, 1989; Yoder & Sinnett, 1985). Despite these gender differences, the phenomena Kanter outlined are best seen not specifically as gender effects, but as consequences of membership in numerically small groups with low status (see Alexander & Thoits, 1985; Frable, 1993). In fact, the negative effects of distinctiveness may be restricted to token or solo members of culturally stigmatized groups in a given context (Crocker & Major, 1989; Frable, Blackstone, & Scherbaum, 1990; Major & Crocker, 1993; Niemann & Dovidio, 1998).

The occupational inappropriateness of a profession refers to its gender stereotyping, or the extent to which women or men stand out as members of that profession. As Yoder (1991) noted, the gender stereotyping of an occupation has a strong normative component that includes two types of sex ratio (for the occupation as a whole, and for the organization as a whole) which should be considered alongside Kanter's (1977a, 1977b) focus on the sex ratio in the work group. Yoder pointed out that all of the studies on women and men tokens involved gender-inappropriate occupations. Thus token women have been studied as, for example, managers (Fairhurst & Snavely, 1983b), academic faculty (e.g. Toren & Kraus, 1987), lawyers (e.g. MacCorquordale & Jensen, 1993) and police officers (e.g. S. E. Martin, 1980). Whereas token men have been studied as, for example, nurses (e.g. Ott, 1989), social workers (Kadushin, 1976), child-care workers (e.g. Seifert, 1973) and flight attendants (J. L. Young & James, 2001). From these studies Yoder concluded that distinctive women in gender-inappropriate occupations do tend to experience performance pressures, isolation and role encapsulation, but men do not.

Intrusiveness refers to those pioneer members of the minority group who are the first, or the first significant cohort, to break into a new occupation or organization (Laws, 1975; Yoder, 1991, 1994). If women are seen as

'intruders', the benefits of decreased distinctiveness that Kanter envisaged may be gained at the cost of one or more types of backlash reaction from the majority. Increasing proportions of the minority might worsen the situation for tokens if the majority views them as a threat to their status, and then react with increased discrimination (see Blalock, 1967; South et al., 1982), which does not level off until the minority proportion of the whole group reaches about 30–40% (Allmendinger & Hackman, 1995; P. Y. Martin, 1985; Pfeffer & Davis-Blake, 1987). Men in male-dominated occupations may react especially strongly to women's intruding, because jobs dominated by men are accorded higher prestige (e.g. Jacobs & Powell, 1985; but cf. Glick, 1991) and pay better wages (Glick, 1991). These benefits are likely to be eroded with the intrusion of women in significant numbers (Pfeffer & Davis-Blake, 1987; Reskin & Roos, 1990; Shaffer, Gresham, Clary, & Theilman, 1986; Toren, 1990). In contrast, women may believe, or at least hope, that the intrusion of men into their less prestigious, female-dominated occupations will increase their pay and prestige.

Based on this review of the literature, group proportions can be associated with the negative perceptual processes and interaction dynamics outlined by Kanter (1977a, 1977b). However, these effects will occur primarily, and be strongest, when the token group has low status and/or is stigmatized, and is attempting to pass into a traditionally inappropriate occupation for the first time. In the two studies reported below we were unable to remove all of the confounds found in prior research, which tend to be features of gender relations outside the laboratory. However, because both our studies were conducted using female and male academics in a range of group proportions, we can explore Kanter's phenomena as consequences of membership in numerical minority groups, rather than necessarily as gender effects. It remains true, nonetheless, that although university women are not necessarily seen as occupationally distinct (Niemann & Dovidio, 1998), they may still be seen as occupationally inappropriate (Laws, 1975) and intrusive, especially in stereotypically male domains, which is where the male majority is likely to be most strongly skewed (Laws, 1975; Yoder, 1991, 1994).

Our research reports further tests of Kanter's hypotheses, and extends them in a number of ways. Previous research has typically blurred the distinction between the processes of visibility, polarization and assimilation (and their associated interaction dynamics) and failed to assess them with unique dependent measures. We devised a set of specific dependent measures to tap each aspect of the theory. We also introduce the concept of perceived variability to this research literature, a variable that has not yet been related to Kanter's theorizing, but does appear to be central to it. In particular, we are interested in the finding that group members tend to perceive out-groups as being less variable, or more homogeneous, than in-groups (the 'out-group homogeneity', or OH, effect; Jones, Wood, & Quattrone, 1981; for reviews, see Linville, 1998; Ostrom & Sedikides, 1992); but that under some circumstances there is an opposite, but weaker 'in-group homogeneity' (IH) effect (Simon & Brown, 1987; for reviews, see Devos, Comby & Deschamps, 1996; Voci, 2000). The relevance of perceived variability to Kanter's (1977a, 1977b) theory is most obvious in her discussion of 'assimilation'. She gives as an example dominants' mistaking one token for another; this is the kind of within-group confusion reported by Taylor, Fiske, Etcoff, and Ruderman (1978), a measure which some researchers have taken as a measure of perceived variability (Lorenzi-Cioldi, 1998; Lorenzi-Cioldi, Eagly & Stewart 1995; Stewart, Vassar, Sanchez, & David, 2000). Kanter also stated that when proportions become less extreme (i.e. from skewed to tilted) the 'minority', as opposed to 'tokens', 'begin to become individuals differentiated from each other' (1977b, p. 966). However, we know of no research that explicitly compared perceived variability in skewed and tilted groups, although there is now an extensive literature on gender and group size as moderators of perceived group variability.

Gender and group size as moderators of perceived variability

There is evidence that both gender and group size can moderate perceived variability, although how reliable the effects are, and what drives them, is debated (see Rubin, Hewstone, Crisp, Voci, & Richards, 2004). With regard to gender, Lorenzi-Cioldi (1993, 1998; Lorenzi-Cioldi et al., 1995) has argued that the OH effect appears to be relatively strong among men, but weaker and even reversed among women. Lorenzi-Cioldi and colleagues (1995) argued that this gender effect may be best understood in terms of status. As we noted above, gender is typically confounded with status and power (see Ridgeway & Smith-Lovin, 1999), and these variables affect category differentiation (see Brewer, 1993; Fiske, 1993). Thus high-status groups tend to be perceived as collections of distinct individuals (i.e. heterogeneous), whereas low-status groups tend to be perceived as aggregates of interchangeable individuals (i.e. homogeneous). Lorenzi-Cioldi (1998) also argued that gender is a more salient category for women than men, because of their lower status; moreover, men may find it harder, or be more reluctant, to identify with their gender category than is the case for women (see Branscombe, 1998; Fajak & Haslam, 1998). Hence women are more likely to both perceive themselves and be perceived as more of a group, whereas men are more likely to perceive themselves and be perceived as a collection of individuals (as reported by H. Young, van Knippenberg, Ellemers, & de Vries, 1999; see also Cross & Madson, 1997). The major weakness of the status account, however, is that where studies have included a direct measure of status, they have consistently reported null effects (see Lorenzi-Cioldi, 1998; Rubin et al., 2004), a result Lorenzi-Cioldi (1998) attributes to social desirability concerns.

Group size, a salient attribute of many natural intergroup contexts and one that often covaries with differences in status and power, can also affect perceived variability. Simon (1992; Simon & Brown, 1987) argued that members of non-minority groups show a relative OH effect, but members of minority groups show a relative IH effect (e.g. Simon & Brown, 1987; Simon & Pettigrew, 1990; see also Mullen & Hu, 1989, for meta-analytic support). Although, on statistical grounds, larger samples are more variable than smaller ones (see Bartsch & Judd, 1993), this cannot be the whole explanation. There is only a weak or nonsignificant correlation between perceived group size and OH (Simon & Mummendey, 1990), and participants who are not assigned to groups do not perceive the minority as more homogeneous than the majority (Simon & Brown, 1987).

Simon (1992) proposed an explanation of group-size effects in terms of category salience, threat to self-esteem, and status. Being in a minority, which tends to make group membership more salient anyway (see Brewer, 1993; Mullen, Brown & Smith, 1992), may pose a threat to group members' self-esteem. Minority members may respond by perceiving their in-group as more homogeneous; thus they stereotype themselves more in terms of their minority group membership, promoting in-group solidarity and accentuating social identity (Tajfel & Turner, 1986; see Ellemers & van Rijswijk, 1997). Moreover, group size tends to be correlated with status (see Farley, 1982); members of majority groups who have relatively high in-group status show an OH effect, whereas the typically low status of minority groups increases category salience and leads to an IH effect (see Lorenzi-Cioldi, 1998; Simon & Hamilton, 1994).

Gender and group size converge when being in a distinct minority heightens women's consciousness of their stigmatized status and/or gender group. This awareness does indeed increase their perceived similarity to women as a group (Foster & Matheson, 1998; Hogg & Turner, 1987), which is consistent with an IH effect. This IH effect is especially likely when group boundaries are impermeable, which tends to lead members to identify more strongly with their in-group (Doosje, Ellemers, & Spears, 1995).

Recently studies have also analyzed the effects of power on perceived group variability (see Guinote, 2004, for a review). Positions of power are often occupied by majority, rather

than minority, members, giving them direct control of important outcomes for minorities. People are more attentive to those who have power in an effort to predict and control their outcomes (Fiske, 1993), and thus it would make sense for less powerful minority members to perceive greater variability in a more powerful majority outgroup, than in their ingroup. This is exactly what Guinote, Judd, and Brauer (2002) found; (indeed they also showed that powerful groups were actually more variable than powerless groups, a fact detected by uninvolved observers; see also Keltner, Gruenfeld, & Anderson, 2003, for a similar argument relating to status). But this effect is moderated by several factors. Minority, powerless and low status members may also perceive outgroups as relatively homogeneous under conditions of intergroup conflict and threat (Corneille, Yzerbyt, Rogier, & Buidin, 2001; Rothgerber, 1997), and the powerful are more likely to individuate the less powerful when they feel responsible for their subordinates (Overbeck & Park, 2001) or have a communal orientation (Chen, Lee-Chai, & Bargh, 2001).

Thus gender, group size, status and power (status apparently relating to both gender and size) can have an impact on perceptions of group variability, and outside the laboratory, of course, these characteristics often covary. This was the case for Brown and Smith's (1989) frequently cited study of men and women academics' perceptions of their gender in-group and out-group in their university, where women were in a very small numerical minority, and had low status (and probably low power) compared with men. Their study comes closest to integrating Kanter's theory with research on perceived variability. Brown and Smith reported that both participant groups rated the female minority as more homogeneous than the male majority (i.e. the women rated their in-group more homogeneous than the out-group, whereas the men rated their in-group more heterogenous than the out-group). Unfortunately, it is impossible to attribute the results of this field study to a gender effect for women academics, their minority group size, or their lower status in this setting, primarily because Brown and Smith were only able to study a female minority and a male majority. Moreover, although participants were drawn from different faculties (which presumably differed in their gender proportions), the sample size did not permit an analysis of this variable, and hence could not test hypotheses based on Kanter's work. In both our studies we investigate whether group proportions moderate the effects reported by Brown and Smith; in our second study we were also able to overcome the typical confound between gender and majority/minority status by considering both men and women in majorities and minorities.

The present research integrates findings on both relative group proportions and perceived group variability, and extends Brown and Smith's (1989) study. We carried out this research in two university settings in the UK (Study 1) and Italy (Study 2), which provided the opportunity to test our main hypotheses under different conditions of organizational diversity. Given that our research locations were both universities, it might be argued that their typical liberal atmosphere would offer an unpromising context in which to research such issues. However, studies investigating Kanter's theory in university settings have tended to support it (e.g. Toren, 1990; Toren & Kraus, 1987; Yoder, Crumpton, & Zipp, 1989; C. J. Young et al., 1980).

Study 1

The research context for our first study was higher education in the UK where women are distinctly underrepresented. Since women entering a profession previously dominated by men typically cluster at lower levels of status (Allmendinger & Hackman, 1995; Lie & O'Leary, 1990), it is not surprising that the underrepresentation of women in British universities is especially polarized at more senior levels.[1]

Our first study tested hypotheses derived from Kanter's (1977a, 1977b) work on sex ratios, and from more recent literature on perceived group variability (e.g. Lorenzi-Cioldi, 1998;

Simon, 1992). We tested Kanter's hypothesis that women would suffer greater visibility, polarization and assimilation in male-skewed than male-tilted settings. We also compared women's and men's perceptions of group variability under each sex ratio. For (high status) men, we predicted an OH effect (Brown & Smith, 1989; Lorenzi-Cioldi, 1998), which should be exaggerated when they are in a skewed majority (see Brewer, 1993; Simon, 1992). This prediction is also consistent with Kanter's theorizing, since she expects 'dominants' in the skewed setting to see the smaller group, 'tokens', as more distinct, to see women and men as more polarized, and to assimilate token women members more to the stereotype. For (low status) women we predicted an IH effect (Brown & Smith, 1989; Lorenzi-Cioldi, 1998; Simon, 1992), which would be accentuated when they are a token minority. Again, this hypothesis is consistent with Kanter's theorizing, since she expects that token women in a male-skewed setting will feel more distinctive as a subgroup and, because stigmatized, feel more discomfort and dissatisfaction, all of which should lead them to emphasize in-group cohesiveness (Simon, 1992).

Method

Design and participants The design of the study was a two-factor quasi-experimental design: 2 (participant gender: female/male) × 2 (group proportions: male-skewed/male-tilted). We sent questionnaires to all full-time members of the academic staff (676; 136 females, 540 males) in 20 departments of a British University.[2] A total of 265 respondents in skewed and tilted departments returned completed questionnaires (71 females, 194 males; response rate 39.2%), from which 69 were removed for having incomplete questionnaires, leaving 188 (male-skewed: 12 females, 77 males; male-tilted: 32 females, 67 males).

Procedure We obtained data on numbers of female and male full-time academic staff in all university departments from the central university administration. We then contacted departments to verify their list of current staff, and their academic status. We then classified each department in terms of the relative proportions of male staff.[3] The departments selected and their proportions of male staff were as follows: *Male-skewed* (M = 92% male: Engineering, Mathematics, Biology, Music, City Planning, Molecular and Medical Sciences, Business); *Male-tilted* (M = 73% male: Maritime and Transport Studies, Earth Sciences, Computer Science, Social Studies, Architecture, History, Education, English, European Studies, Law).

We sent all members of the original sample a questionnaire in the internal mail. The cover sheet explained that the survey was concerned with social perceptions in academic groups and that it would take approximately 30 minutes to complete. We assured participants that their responses would be confidential and anonymous, having no implications for themselves or their colleagues. To ensure that respondents felt both anonymous and secure, they were asked to return their questionnaires in the unnamed internal mail envelope provided. The first section of the questionnaire requested demographic information: gender, age, academic position, university department, length of time working in that department and whether the position was full-time or part-time. The following sections of the questionnaire contained the dependent measures in the order in which they follow. We assessed perceived variability first, so that these ratings would not be affected by multiple measures relating to gender issues, which might have affected these perceptions, and limited comparability with Brown and Smith's (1989) study.

Perceived dispersion For the purpose of replication, we assessed perceived variability in exactly the same way as Brown and Smith (1989). (1) We used the range measure (Jones et al., 1981), which assesses the 'perceived dispersion' component of variability (and not 'stereotypicality', see Park & Judd, 1990). It is simple to administer, and has been identified as one of the most robust measures of perceived variability (Ostrom & Sedikides, 1992; Park & Judd, 1990). (2) Participants rated the variability of gender in- and out-groups on three dimensions—

'productivity' (e.g. publications or research output), 'communication skills' and 'administrative efficiency'—which 'closely correspond to the three criteria by which academics in British universities are judged for appointment and promotion' (Brown & Smith, 1989, p. 66). We averaged ratings of in-group and out-group variability across the three dimensions to yield indices of in-group and out-group variability (Cronbach's alphas = .727 and .362).[4] (3) The three scales were anchored with the endpoints 'extremely unproductive/poor communication skills/inefficient' ('bottom 5% of all UK staff in comparable departments') and 'extremely productive/good communication skills/efficient' ('top 5% of all UK staff in comparable departments'). (4) In a later section of the questionnaire, participants rated how important each of the three dimensions was (1, not at all; 7, very).

To anchor their judgements, participants first marked with a 'X' on each of three 100 mm scales where on average they thought members of the target group in their department fell.[5] We then asked participants to go back to each scale and mark where the most extreme target group members would fall, by making two vertical slashes on each line; the difference between the rated extremes (full range) was the measure of perceived dispersion for the target group. The next page of the questionnaire asked respondents to make similar ratings for the other target group (order of rating target groups was randomized across questionnaires).

Visibility and performance pressures Four items assessed visibility (how 'noticeable', 'distinctive', 'self-conscious' or 'comfortable' respondents felt in their department; 1, 'not at all' to 7, 'very'). A scale formed from the first two items provided a reliable measure (alpha = .732). An 11-item scale used by Allmendinger and Hackman (1995) assessed satisfaction with specific organizational features: compensation (2 items); job security (2); work relationships (3); and growth opportunities (4). Respondents rated each aspect of their job on a 7-point scale (1, 'extremely dissatisfied' to 7, 'extremely satisfied'; alpha = .727).[6]

Polarization and group-boundary heightening We used three measures to assess polarization. Allmendinger and Hackman's (1995) scale of gender relations assessed the climate of gender relations within each department. This 7-item scale included items such as: 'The standing of women in this department has improved in the last few years', and 'Women's opportunities for advancement in this department have diminished over the last few years' (1, 'disagree strongly' to 7, 'agree strongly'). Scores on the three negative items were reverse-coded, so that higher scores denote better relations between gender groups, and scores across all seven items were averaged to yield a reliable scale (alpha = .640). We also asked, 'how much *impact* do you feel female/male members of staff have on important decisions made concerning the department?' (1, 'not at all' to 7, 'very much'), and 'what *status* do you think female/male members of staff have in the department?' (1, 'very low' to 7, 'very high').

Four different measures assessed isolation from formal, informal and social networks. Two items assessed how much respondents felt they *contributed* to activities in their department: (a) by research seminars and (b) through departmental meetings (1, 'not at all' to 7, 'very much'; alpha = .517). Three items asked, 'how much *time* do you spend with other members of staff in your department'? (1, 'none at all' to 7, 'a great deal'): (a) formally (e.g. meetings); (b) informally (e.g. talking to, exchanging views with); and (c) socially (e.g. outside the department); these items formed a reliable scale (alpha = .667). Two items each assessed: 'how much *support* do you feel you get from female/male members of staff in your department?' (1, 'none at all' to 7, 'very much'); and 'how *familiar* are you with female/male members of staff in your department?' (1, 'not at all' 7 to 'very').

Assimilation and role entrapment Perceived variability (see above) was our main measure of assimilation. Warr's (1990) 12-item scale of 'Affective well-being' assessed self-reported stress at work. Respondents rated on a 6-point scale (1, 'never' to 6, 'all the time') how their

job makes them feel, thinking of the past month, in terms of 12 affective adjectives (e.g. tense, gloomy, calm). Scores on positive words were reverse-coded, so that higher scores denote higher stress, and scores across all 12 items were averaged to yield a highly reliable scale (alpha = .915).

Perceived group size Finally, respondents were asked what respective proportions (as percentages summing to 100) of full-time members of academic staff in their department were women and men.

Results and discussion

Overview We report our results in two parts: (1) a number of preliminary analyses, to check on our samples and possible confounds in this quasi-experimental design; and (2) analyses of the main dependent measures grouped by their relevance to Kanter's (1977a, 1977b) theory, including perceived dispersion as a measure of assimilation. The core design was a 2 (participant gender) × 2 (group proportions: male-skewed/male-tilted) design and unless otherwise noted we used this design for the analysis of variance (ANOVA). For dependent measures that involved separate ratings of in-group and out-group, we added a within-subjects factor (target group: in-group vs. out-group) to this design and computed a mixed-model ANOVA, with repeated measures on the last factor. Because there are, in fact, relatively many male and relatively few female academics, there are large differences in cell sizes; we therefore used a regression ANOVA to prevent differences from one group contributing more to the overall OH effect than differences from the other group (Ostrom & Sedikides, 1992). The means of all dependent measures are shown in Table 1. It could be argued that the proportion factor would be better analyzed as a regressor, rather than as a categorical variable. We prefer the adopted analysis, however, precisely because Kanter's theory (1977a, 1977b) argues that the different *categories* (i.e. tilted, skewed) are phenomenologically different from each other, and indeed that the effects are *categorical* effects.

Preliminary analyses To test whether respondents were aware of the proportions of the two gender groups in their department, we computed a 2 (gender) × 2 (group proportions) ANOVA on the perceived percentage of male staff minus the perceived percentage of female staff. Positive scores indicate a perceived male majority. This analysis yielded a main effect of department ($F(1, 184) = 137.83$, $p < .0005$), qualified by a department by gender interaction ($F(1, 184) = 6.56$, $p < .025$). Simple main effects tests revealed that women perceived a larger difference in group sizes in skewed ($M = 82.50$) than tilted departments ($M = 42.06$) ($F(1, 184) = 63.58$, $p < .0005$), as did men ($M_{skewed} = 76.90$ vs. $M_{tilted} = 50.94$) ($F(1, 184) = 107.53$, $p < .0005$). In the tilted departments only, men also perceived a larger difference in group sizes ($M = 50.94$) than did women ($M = 42.06$) ($F(1, 184) = 7.60$, $p = .006$); this gender effect does not qualify the key result: that both women and men were aware of differences in group size.

Our quasi-experimental design requires that we take special care to investigate the possibility that other variables (e.g. academic status, age and experience) covary with the variables of interest. Unfortunately, given the background to this research (viz. gender differences in university departments and the relatively recent attempts to prevent discrimination against women), we would expect some confounds, which should nonetheless be acknowledged.

We first sought to compare *actual* gender differences in proportions of senior and junior staff in male-skewed and male-tilted departments, by referring to faculty lists for all the departments from which our respondents were drawn.[7] We were hampered by the very small number of senior women in skewed departments, compared with other combinations of seniority and department (*male-skewed*, senior: female, 3, male, 143; junior: 22, 19; *male-tilted*, senior: 16, 126; junior: 50, 95). We therefore tested the null hypothesis that there was no association between gender and seniority (or, an odds ratio equal to 1) in each type of setting; we rejected this hypothesis in both tilted ($\chi^2(1) = 20.54$, $p < .001$) and skewed ($\chi^2(1) = 14.90$,

Table 1. Mean ratings as a function of gender, group proportions, and target group (Study 1)

Target group	Participant gender Group proportions Women		Men	
Measure	Male-skewed	Male-tilted	Male-skewed	Male-tilted
Visibility and performance pressures				
Visibility	4.88	4.80	5.01	4.86
Job and organizational satisfaction	4.95	4.93	4.82	4.80
Polarization and group-boundary heightening				
Gender relations	3.97	4.02	4.43	4.37
Impact				
In-group	3.08	4.31	5.88	5.84
Out-group	6.00	6.16	4.10	4.34
Status				
In-group	3.42	4.22	5.51	5.33
Out-group	5.75	5.75	4.33	4.47
Contribution to department	4.38	4.45	4.75	4.51
Time spent with colleagues	3.89	3.90	3.97	3.85
Support				
In-group	4.75	5.03	4.88	4.40
Out-group	4.25	4.47	4.66	4.60
Familiarity				
In-group	5.00	4.69	5.12	4.76
Out-group	4.58	4.41	4.78	4.59
Assimilation and role entrapment				
Perceived dispersion				
In-group	38.60	46.34	69.43	66.56
Out-group	70.56	64.12	40.57	55.29
Affective well-being	3.13	3.12	3.05	3.16

$p < .001$) departments. We then tested whether the difference between the odds ratios in the two types of department was significant. We did not reject the hypothesis that there was no difference between these two ratios ($\chi^2(1) = 0.93$, $p = .35$). Thus, although gender *was* associated with seniority in both types of department, we could rule out the first potential confound: there was no evidence that this association was different in the two settings.

Next, we computed a 2 (participant gender) × 2 (group proportions) ANOVA on participants' age, which revealed only a main effect for gender ($F(1, 184) = 15.05$, $p < .0005$). Women ($M = 38.77$ years) were significantly younger than men ($M = 45.85$ years). Because there were no effects involving the group proportions factor, differences in participants' age cannot account for any differences involving group proportions, so we can rule out the second potential confound.

Our final preliminary analysis was a 2 (gender) × 2 (proportions) ANOVA on participants' number of years in their department. Again, the only effect was a main effect for gender ($F(1, 184) = 13.52$, $p < .0005$). Women ($M = 5.63$ years) had been members of their department significantly fewer years than men

(M = 11.67 years), but again this effect did not vary with group proportions.

To summarize, although these analyses indicate that women staff were in more junior positions, were younger, and had been in their departments for less time than men (all of which we would expect if women were disadvantaged), none of these variables was confounded with the group proportions factor.

Visibility and performance pressures The ANOVAs using both the 'visibility' scale score and the measure of job/organizational satisfaction (Allmendinger & Hackman, 1995) yielded no significant effects, thus giving no indication that token women (in male-skewed departments) felt more visible or had lower levels of job satisfaction than minority women in male-tilted departments. As satisfaction levels are generally higher for more senior than junior faculty (e.g. Niemann & Dovidio, 1998; Steene, Guinipero, & Newgren, 1985), we also computed a separate 2 (gender) × 2 (seniority of staff: senior/junior) ANOVA within the male-tilted departments only; however, this analysis revealed no significant differences. Thus these first analyses provided no evidence either that token women felt particularly distinctive and unsatisfied, or that minority women differed from majority men in either respect.

Polarization and group-boundary heightening The ANOVA on Allmendinger and Hackman's (1995) scale of departmental gender relations revealed only a significant main effect for gender (F(1,184) = 6.16, p < .025); women viewed the relations between gender groups in their department as slightly worse (M = 3.99) than did men (M = 4.40). The ANOVA on impact yielded only a gender by target group interaction (F(1, 184) = 54.83, p < .0005). Simple main effects tests revealed that women thought the out-group (M = 6.11) had more impact in the department than the in-group (M = 3.98) (F(1, 184) = 30.091, p < .0005), whereas men thought the in-group (M = 5.86) had more impact than the out-group (M = 4.21) (F(1, 184) = 46.90, p < .0005). The ANOVA for perceived status revealed a main effect for target group (F(1, 184) = 2.48, p < .05), qualified by a gender by target group interaction (F(1, 184) = 70.07, p < .0005). Simple main effects tests showed that women thought the out-group (M = 5.75) had higher status than the in-group (M = 4.00) (F(1, 184) = 47.04, p < .0005), whereas men thought the in-group had higher status (M = 5.43) than the out-group (M = 4.40) (F(1, 184) = 42.92, p < .0005). Thus both men and women reported that men had higher status.

In male-skewed departments, there was also no evidence of greater boundary heightening. Scale scores for contributions to departmental activities and time spent with colleagues yielded no significant effects, thus giving no evidence that token women in male-skewed departments were more isolated from formal or informal networks than women in male-tilted departments. The ANOVA for support revealed a main effect for target group (F(1, 184) = 3.97, p < .05), qualified by the gender by target group interaction which was almost significant (F(1, 184) = 3.60, p = .059). Simple main effects tests revealed that only women felt they received slightly less support from out-group (M = 4.41) than in-group (M = 4.95) colleagues (F(1, 184) = 5.93, p < .025). For familiarity, there was a main effect for target group; respondents rated themselves more familiar with the gender in-group (M = 4.91) than the out-group (M = 4.64) (F(1, 184) = 7.58, p = .0065). This last finding is consistent with Park and Rothbart's (1982) prediction that even in the case of gender groups, where there is extensive cross-group contact, there is greater in-group familiarity.

Overall, these results do indicate stronger polarization for women than men. Women judged gender relations as worse, and only women reported receiving less support from gender out-group than in-group colleagues. Both men and women felt that men had more impact and status in their department, and reported being more familiar with colleagues of the same gender group. Once again, there were no effects involving group proportions.

Assimilation and role entrapment Before computing the ANOVA for perceived dispersion, as

a measure of assimilation, we computed a 2 (gender) × 2 (group proportions) ANOVA on participants' importance ratings for the three dimensions. There were no significant effects, but both women (M = 5.70) and men (M = 5.44) agreed in rating all three dimensions quite important. The ANOVA on perceived dispersion yielded a significant group proportions by target group interaction (F(1, 184) = 87.42, $p < .0005$), which was qualified by a significant gender by proportions by target group interaction (F(1, 184) = 10.92, $p < .005$). In male-tilted departments, women rated the in-group (M = 46.34) less variable than the out-group (M = 64.12) (F(1, 97) = 14.55, $p < .0005$), and men rated the in-group (M = 66.56) more variable than the out-group (M = 55.29) (F(1,97) = 12.25, $p < .001$). Exactly the same pattern of results was found in the male-skewed departments, but the effects were even stronger, and differences between mean ratings of in- and out-groups were much more extreme. Women rated the in-group (M = 38.60) less variable than the out-group (M = 70.56) (F(1, 87) = 20.49), while men rated the in-group (M = 69.43) more variable than the out-group (M = 40.57) (F(1, 87) = 107.26, $p < .0005$). These results are consistent with an IH effect for women and an OH effect for men in both kinds of department but, as predicted from both Kanter's (1977a, 1977b) theory and the literature on perceived variability (e.g. Lorenzi-Cioldi, 1998; Simon, 1992), results are more extreme in male-skewed than male-tilted departments. These results are also consistent with the conclusion that men in the majority are seen as more variable than women in the minority by both majority men and minority women (i.e. a main effect of target group; see Brauer & Judd, 2000).

We also compared the mean perceived dispersion of each target group, separately for men and women, with the results reported by Brown and Smith (1989), who did not compare tilted and skewed groups. For men, their results ($M_{\text{in-group}}$ = 65.17; $M_{\text{out-group}}$ = 55.29) were very similar to our male-tilted settings ($M_{\text{in-group}}$ = 66.56; $M_{\text{out-group}}$ = 55.29), but men in our male-skewed settings tended to see slightly greater in-group, and considerably less out-group, variability ($M_{\text{in-group}}$ = 69.43; $M_{\text{out-group}}$ = 40.47). For women, Brown and Smith's results ($M_{\text{in-group}}$ = 55.60; $M_{\text{out-group}}$ = 67.00) were again quite similar to those of women in our male-tilted settings ($M_{\text{in-group}}$ = 46.34; $M_{\text{out-group}}$ = 64.12), but women in our male-skewed settings tended to see the in-group as considerably less variable, and the out-group as somewhat more variable ($M_{\text{in-group}}$ = 38.60; $M_{\text{out-group}}$ = 70.56).

The ANOVA for Warr's (1990) 'Affective well-being' scale yielded no significant effects, and the means shown in Table 1 indicate that stress levels were quite low. In the only other study we know of that measured stress in relation to group proportions, Ott (1989) also found no difference in stress levels for women police in skewed versus tilted settings. Thus even though there is strong evidence of greater assimilation in skewed settings, as measured by perceived dispersion, this is not necessarily reflected in higher stress levels. Indeed, if Simon (1992) is correct, an IH effect for members of small minorities is a positive response to threat that portrays the in-group as united and cohesive, which may also provide social support to help protect against stress (see Cohen & Wills, 1985).

Overall, the results of our first study showed no effects of visibility, but evidence of greater polarization and assimilation was reported by women than men in academia. In interpreting these findings, it should be reiterated, that these are not 'pure' gender effects; as we noted earlier, women had less seniority, were younger and were relatively newer members of their departments than men. Thus, as earlier critics of Kanter's (1977a, 1977b) work pointed out (see Yoder, 1991, 1994), gender is confounded with status (e.g. Ridgeway & Diekema, 1992). Only one measure (perceived dispersion as an index of assimilation) revealed an interaction with group proportions. Our results on this measure provided a strong replication of Brown and Smith's (1989) findings, and extended them to sex ratios of varying proportions. The effects of group proportions were exactly as predicted in our extrapolation from Kanter's hypotheses. Taken together, however, the results of our first study provide only limited

support for Kanter's hypotheses. We therefore carried out a second study, to replicate the finding that perceived dispersion varies with extremity of group proportions, and to extend the types of group proportions investigated.

Study 2

One obvious, if understandable, limitation to our first study is that, like Brown and Smith (1989), we were still only able to study men in a majority and women in a minority. In our second study, we were able to address this issue, by moving to a new context, a university in Italy, in which there were some academic departments with a balanced sex ratio, and one department with a female-tilted sex ratio. As we noted earlier, Yoder (1991, 1994) has criticized much of the work on Kanter's theory for failing to make comparisons between groups of varying proportions (for notable exceptions, see Dworkin et al., 1986; Izraeli, 1983; Ott, 1989; South et al., 1982; Spangler et al., 1978). To our knowledge, our second study is the first to compare group proportions ranging from male-skewed, though male-tilted and balanced, to female-tilted settings (we were unable to find any female-skewed university departments).

In this study we measured only a small subset of variables, and focused on perceived group variability. We did this for two reasons. First, and unavoidably, the response rate to a pilot study in the Italian university was very low, and we received feedback that the length of the survey had contributed to this. Second, in Study 1 we had only found an effect of group proportions on one variable, perceived dispersion; moreover, this was the first research to suggest this measure as an index of Kanter's (1977a, 1977b) concept of assimilation, and we wanted to replicate this effect.

Thus our second study sought to replicate the finding that perceived dispersion (an OH effect for men, and an IH effect for women) was moderated by group proportions, and to test whether perceived dispersion varied as a linear function of group proportions.

Method

Design and participants The design of the study was a two-factor quasi-experimental design: 2 (participant gender: female/male) × 4 (gender proportions: male-skewed/male-tilted/balanced/female-tilted). We sent questionnaires to all full-time members of the academic staff in eight departments of an Italian university. We randomly selected two male-skewed and two male-tilted departments, all three balanced departments, and the sole female-tilted department that existed. Of the 348 staff (124 females, 224 males) sent questionnaires, 99 returned them (34 females, 65 males; response rate, 28%), and 11 respondents had to be removed for having incomplete questionnaires. The final number of participants was 88 (male-skewed: 5 females and 31 males; male-tilted: 4 females and 5 males; balanced: 17 females and 16 males; female-tilted: 7 females and 3 males).

Procedure We followed the same procedure as Study 1, except that four types of department were included, and the questionnaire was drastically shortened so that it took approximately 10 minutes to complete. It contained only measures of perceived dispersion, impact and status (each involving separate ratings of female and male target groups. The departments selected and their proportions of female and male staff were as follows: *male-skewed* (M = 92% male: Electronics and Informatics, Philosophy); *male-tilted* (M = 80% male: Biochemistry, History); *balanced* (M = 60% male: Biology, Visual Arts and Music, Language and Literature); *female-tilted* (M = 69% female: Education).

Results and discussion

Overview We carried out the same preliminary analyses on respondents' age and experience as in Study 1; for this study, however, there were no reliable effects of gender. We then analyzed the data using a 2 (participant gender) × 4 (group proportions: male-skewed/male-tilted/balanced/female-tilted) × 2 (target group: in-group/out-group) mixed model ANOVA, with repeated measures on the last factor. We had strong theoretical predictions

that the difference between ratings of in-group and out-group would vary as a linear function of the relative proportions of men and women (i.e. from male-skewed to male-tilted to balanced to female-tilted). We therefore tested these predictions (separately for female and male respondents) by regressing the relevant in-group minus out-group difference score on the appropriate effects coding of the four levels of department. For female respondents, for whom we predicted an IH effect, the four levels of group proportion were coded as follows: male-skewed: –2; male-tilted: –1; balanced: +1; and female-tilted: +2. For male respondents, for whom we predicted an OH effect, the four levels of group proportion were coded: male-skewed: +2; male-tilted: +1; balanced: –1; and female-tilted: –2.

Because there are again large differences in cell sizes we used a regression ANOVA. The means of all dependent measures are shown in Table 2.

Perceived dispersion The three separate ratings of in-group and out-group variability on the range measure were collapsed to yield reliable indices of in-group and out-group variability (alphas = .709 and .744, respectively). The ANOVA yielded a significant gender by target group interaction ($F(1, 80) = 5.76$, $p < .025$), which was qualified by a significant gender by group proportions by target group interaction ($F(3, 80) = 20.21$, $p < .0005$). For male-skewed departments, simple main effects tests revealed that women rated the in-group ($M = 55.20$) less variable than the out-group ($M = 68.40$) ($F(1, 34) = 7.02$, $p < .025$), whereas men rated the in-group ($M = 65.55$) more variable than the out-group ($M = 49.77$) ($F(1, 34) = 62.15$, $p < .0005$). These results again indicate an IH effect for minority women and an OH effect for majority men (or a target-group main effect: men in the majority are seen as more variable than women in the minority). There were no significant differences between ratings of in-group and out-group variability in the other three types of department.

The regression of in-group minus out-group differences in variability on the a priori weightings of the departments was significant for both women ($\beta = .406$, $p < .025$) and men ($\beta = .527$, $p < .0005$); the IH effect for women declined as relative in-group size increased, and the OH effect for men declined as relative out-group size increased. As Table 2 shows, perceived out-group homogeneity for men decreased steeply from male-skewed departments, and was minimal in balanced and female-tilted departments; perceived in-group homogeneity for women decreased steeply from male-skewed departments, and the means were in the direction of out-group homogeneity in the one female-tilted department.

Impact There were significant interactions of gender by target group ($F(1, 80) = 36.17$, $p <$

Table 2. Mean ratings as a function of gender, group proportions and target group (Study 2)

		Participant gender group proportions							
		Women				Men			
Measure	Target group	Male-skewed	Male-tilted	Balanced	Female-tilted	Male-skewed	Male-tilted	Balanced	Female-tilted
Perceived dispersion	In-group	55.20	70.25	56.10	66.86	65.55	68.73	59.23	45.56
	Out-group	68.40	75.83	54.96	60.43	49.77	60.40	55.33	49.33
Impact	In-group	3.00	2.50	4.00	6.57	6.00	5.80	5.50	4.33
	Out-group	6.60	4.75	5.76	4.43	3.74	4.60	4.25	5.33
Status	In-group	3.60	3.75	4.18	5.14	5.58	6.00	5.00	3.67
	Out-group	5.60	6.00	5.35	4.86	4.45	4.80	4.31	4.67

.0005), and department by target group ($F(3, 80) = 4.61$, $p < .05$), which were qualified by the gender by department by target group interaction ($F(3, 80) = 45.95$, $p < .0005$). Simple main effects tests showed that women thought the out-group had more impact than the in-group in male-skewed departments ($F(1, 34) = 16.07$, $p < .0005$; $M_{\text{out-group}} = 6.60$ vs. $M_{\text{in-group}} = 3.00$), male-tilted departments ($F(1, 7) = 10.46$, $p < .025$; $M_{\text{out-group}} = 4.75$ vs. $M_{\text{in-group}} = 2.50$) and balanced departments ($F(1, 31) = 24.84$, $p < .0005$; $M_{\text{out-group}} = 5.76$ vs. $M_{\text{in-group}} = 4.00$). Only in female-tilted departments, i.e.when they were in the majority, did women think the in-group had more impact than the out-group ($F(1, 8) = 7.83$, $p < .025$; $M_{\text{in-group}} = 6.57$ vs. $M_{\text{out-group}} = 4.43$). In contrast, men thought the in-group had more impact than the out-group in male-skewed departments ($F(1, 34) = 39.19$, $p < .0005$; $M_{\text{in-group}} = 6.00$ vs. $M_{\text{out-group}} = 3.74$), male-tilted departments ($F(1,7) = 21.72$, $p < .005$; $M_{\text{in-group}} = 5.80$ vs. $M_{\text{out-group}} = 4.60$) and balanced departments ($F(1, 31) = 11.73$, $p = .002$; $M_{\text{in-group}} = 5.50$ vs. $M_{\text{out-group}} = 4.25$). In female-tilted departments there was a non-significant tendency for minority men to think the out-group had more impact than the in-group ($M_{\text{out-group}} = 5.33$; $M_{\text{in-group}} = 4.33$).

The regression of in-group minus out-group differences in impact on the a priori weightings of the departments was significant for both women ($\beta = .592$, $p < .0005$) and men ($\beta = .368$, $p < .01$); there was a linear decrease in relative perceived in-group impact as actual relative in-group size declined.

Status There was a main effect of target group ($F(1, 80) = 4.23$, $p < .05$), which was qualified by a gender by target group interaction ($F(1, 80) = 25.82$, $p < .0005$), and a gender by department by target group interaction ($F(3, 80) = 16.77$, $p < .0001$). Simple main effects tests showed that women thought the out-group had more status than the in-group in male-skewed departments ($F(1, 34) = 7.02$, $p < .05$; $M_{\text{out-group}} = 5.60$ vs. $M_{\text{in-group}} = 3.60$), male-tilted departments ($F(1, 7) = 10.46$, $p < .025$; $M_{\text{out-group}} = 6.00$ vs. $M_{\text{in-group}} = 3.75$) and balanced departments ($F(1, 31) = 12.18$, $p < .001$; $M_{\text{out-group}} = 5.35$ vs. $M_{\text{in-group}} = 4.18$). In female-tilted departments there was a nonsignificant tendency for women to think the in-group had higher status than the out-group ($M_{\text{in-group}} = 5.14$; $M_{\text{out-group}} = 4.86$). Men thought the in-group had more status than the out-group in male-skewed departments ($F(1, 34) = 62.15$, $p < .0005$; $M_{\text{in-group}} = 5.58$ vs. $M_{\text{out-group}} = 4.45$); the same effect was marginal in balanced departments ($F(1, 31) = 3.91$, $p < .06$; $M_{\text{in-group}} = 5.00$ vs. $M_{\text{out-group}} = 4.31$), and means were not significantly different, but in the same direction in male-tilted departments ($M_{\text{in-group}} = 6.00$; $M_{\text{out-group}} = 4.80$). In female-tilted departments there was a nonsignificant tendency for men to think the out-group had more status than the in-group ($M_{\text{out-group}} = 4.67$ vs. $M_{\text{in-group}} = 3.67$). Overall, these ratings of status tend to follow the actual proportions of male and female senior staff; a large majority of full professors were men in all departments except the female-tilted department, where the majority of full professors were women.

The regression of in-group minus out-group differences in status on the a priori weightings of the departments was significant for both women ($\beta = .414$, $p < .025$) and men ($\beta = .286$, $p < .05$); there was a linear decrease in relative perceived in-group status as actual relative in-group size declined.

To summarize, our second study extended the research by including gender-balanced and female-tilted sex ratios. Although the difference in perceived dispersion for in-group and out-group was only significant for men in the male-skewed setting (where we replicated the OH effect found in Study 1 and Brown and Smith, 1989), relative in-group dispersion for men and women varied as a linear function of group proportions. The OH effect for men tended to disappear as they lost their in-group majority status, and the tendency of women towards an IH effect disappeared as they lost their in-group minority status. However, because the OH effect is stronger for men (Lorenzi-Cioldi, 1998) and is a stronger effect than the IH effect (Voci, 2000), women never show a reliable OH effect, nor do men show a reliable IH effect. These results confirm that perceived dispersion is a useful variable for research testing Kanter's

(1977a, 1977b) hypotheses regarding the effects of group proportions, because it reflects quite subtle quantitative and qualitative changes in intergroup perception and dynamics across different sex ratios. The results for perceptions of impact and status were similar, in that the tendency to see men as having relatively more impact and status in most settings was reversed in female-tilted settings.

General discussion

Our main aims in this research were to test Kanter's (1977a, 1977b) hypotheses concerning group proportions in new ways and in new settings. We sought to identify dependent measures for each of the distinct perceptual phenomena and interaction dynamics Kanter specified, and to introduce perceived group variability (dispersion) as a new measure of assimilation (distorting personal characteristics to fit a generalization, and thus assimilating intragroup differences). We did this in two university settings, in the second of which we could achieve something rarely done in this literature, namely compare men and women in majority, minority and balanced settings. We can claim success in both these general aims, although the overall support for Kanter's theory is quite modest. We discuss our findings with respect to each of the three processes identified by Kanter, the evidence that gender and group size moderate perceived variability, and possible confounds in our quasi-experimental designs.

In our first study we found almost no evidence that the proportional rarity of token women in male-skewed settings resulted in different experiences for them than for minority women in male-tilted departments. Effects involving gender were also limited, rather than ubiquitous. Women did not report being more 'visible' than men, nor did they report lower job satisfaction (which Kanter believed would result from greater performance pressures). On a number of measures, however, women did report perceptions and feelings consistent with their experiencing greater polarization and group-boundary tightening than men. They saw gender relations in their departments as worse than men did, and they reported receiving less support from their gender out-group than in-group, which men did not. This evidence of polarization was strengthened by the findings that both women and men reported that men had more impact and status in their departments, and that they were more familiar with members of their gender in-group than out-group (cf. Park & Rothbart, 1982).[8] Women did not, however, report being more isolated from formal and informal departmental activities. Even where there were effects involving gender in Study 1, we must emphasize that gender was confounded with group size. Women were only ever in the minority, and men in the majority; and relative group proportions only varied within this constraint. Thus the above gender effects must be seen as effects not for women vs. men, but for minority women vs. majority men.

The only measure on which we found any effect of group proportions was perceived dispersion. Our findings for this measure are consistent with previous research suggesting that gender and group size can moderate perceptions of group variability. Our findings replicate those of Brown and Smith (1989) almost exactly—an OH effect for men, but an IH effect for women. This result is consistent with Lorenzi-Cioldi's (1998) conclusion, that the OH effect is a relatively strong effect among men, but weaker, even reversed, among women; and also Simon's (1992) contention that minorities tend to show an IH effect. We qualified and extended this prior work, however, by showing that men's OH effect was accentuated when they were in a skewed majority, whereas women's IH effect was accentuated when they (as a token minority) were faced with a skewed majority of men. These effects are consistent with Kanter's (1977a, 1977b) theorizing. She would expect men in a skewed majority (dominants) to assimilate distinct, token women, and token women to emphasize their in-group coherence (which Simon, 1992, linked to the IH effect). Notwithstanding this clear effect of group proportions on perceived dispersion, token women did not report feeling more stress, as would be predicted if the experience

of greater assimilation were associated with role entrapment.

In our second study, we replicated and extended these results for perceived dispersion. We were able to report a rare test of group proportions ranging from male-skewed to female-tilted settings (albeit including only one female-tilted department). Once again, we found the strongest OH effect for men in male-skewed settings. Moreover, relative in-group dispersion varied as a linear function of group proportions. Perceived out-group homogeneity for men decreased steeply from male-skewed departments, and was minimal in balanced and female-tilted departments; whereas perceived in-group homogeneity for women decreased steeply from male-skewed departments, and the means were in the direction of out-group homogeneity in female-tilted departments. Thus perceived dispersion (which we have argued provides an index of assimilation) is a measure that is quite sensitive to differences in group proportions and should, therefore, be included in future studies testing Kanter's theory (1977a, 1977b). Results for the perceived impact and status of men and women in each department followed the same pattern. Thus for men, relative in-group variability, relative in-group impact and relative in-group status varied as a function of group proportions; the effect was strongest with a large in-group majority and smallest with an in-group minority. For women, relative out-group dispersion was accompanied by tendencies toward relative out-group impact and status, except where women were in a majority, and only here were women rated higher in impact and status than men.

In view of the fact that we found support for Kanter's theory (1977a, 1977b) on just one measure, we should consider carefully, first, the research setting and, second, the measure. One possible explanation for the limited support found is that in the context we investigated (namely, gender relations in higher education) women do not qualify as the kind of token group for which Kanter's theory seems fitted (i.e. low status, stigmatized, occupationally inappropriate and/or intrusive). As academics we hope this is indeed the case! However, women's relative proportions in both universities studied were still strikingly low, especially in traditional male domains (i.e. male-skewed departments) and, as we noted earlier, universities all too often still do show gender-linked differences in the distribution of rewards (see Toren, 1990).

Turning to the measure itself, perceived dispersion, it could be argued that our findings do not indicate assimilation but, rather, reflect real group differences in perceived variability, always a potential issue in studies using real groups (Guinote, 2004; Guinote et al., 2002; Ostrom & Sedikides, 1992).[9] Brown and Smith (1989) noted that if academic women do experience discriminatory selection practices (whether intentional or not), they might have to achieve at a higher level than men to obtain employment or promotion; if this were the case, women would be, in fact, more homogeneous than men with respect to research productivity (one of the three dimensions we used). We tested this idea by comparing actual research output for men and women, but we found no significant difference that might support this explanation.[10] Thus, rather than minority women being, in fact, more homogeneous than majority men, we suggest that our results are more likely an indication of differences in how minority, and especially token, women are *perceived*. In part because they are perceptually salient, minorities—and especially tokens—may be seen as more 'entitative' (i.e. having the nature of an entity or real thing; Campbell, 1958) than majorities, with implications for various aspects of social perception and evaluation (see Hamilton, Sherman, & Lickel, 1998). Future work in this area should therefore include measures of both perceived variability and perceived entitativity.

To conclude, in the rather benign, liberal groves of academe, we found only limited support for Kanter's theory (1977a, 1977b). Women of academe, although often in extreme minorities (tokens) were not especially likely to experience negative consequences associated with processes of visibility, polarization and assimilation. We did, however, report some evidence that minority academic women

reported more polarization than majority men did. Only perceived group dispersion (an index of assimilation) varied systematically with group proportions, as predicted by Kanter, proving a sensitive measure of how men's and women's perceptions changed across skewed, tilted and balanced sex ratios. Although we found the same OH effect for men, and IH effect for women, reported by Brown and Smith (1989), these effects were moderated by whether the in-group or out-group was in the majority, and the extremity of the difference in group proportions, and did not appear to reflect real group differences in variability. Undoubtedly, studying natural groups in organizations, as we have done, introduces challenges and complexities; but we accept them as a worthwhile cost of investigating issues concerning diversity where they really matter—in the real world.

Finally, we hope, and believe, that our research has implications for that world, and specifically for settings in which there is diversity. Perhaps the major implication is that members of (especially extreme) numerical majority and minority groups should be informed about the nature of assimilation biases and how perceptions of group variability are affected by group proportions. It seems especially significant that perceptions of variability, impact and status tend to follow a similar pattern. This may hold out some promise for interventions to increase the perception of intragroup differences and so try to ensure that all members within an organization have the same opportunity to have an impact on the organization (e.g. have their voices heard, make their distinctive contributions) and to achieve equal status and power within it.

Notes

1. Statistics compiled by the Association of University Teachers report that women represent 27% of the academic workforce, with just 5.6% employed as full professors (reported in *The Guardian*, October 14, 1997).
2. We did not use two departments because they either did not respond when asked to check staff details (one department), or had no female staff (one department). A further three departments had only one female staff member. Although these solo-minority settings are of great interest theoretically, we chose not to include them for ethical reasons. Given the nature of our questionnaire, using them would have meant that male staff would be rating one *identifiable* female colleague when rating 'women in your department' and solo women's responses would no longer be anonymous. We also approached three departments in which proportions of female and male staff were balanced; however, the absolute numbers and response rates in these departments were very low, especially for men (men: 11.8% ; women: 33.3%), so we did not include these departments in our analysis (but see Study 2). Finally, we did not collect data from colleagues in the psychology department, because they might have been aware of the hypotheses being tested.
3. Kanter's (1977a, 1977b) criteria for skewed and tilted groups are, in fact, rather vague; we therefore followed Allmendinger and Hackman's (1995) criteria (skewed: 1–11% minority members; tilted: 24–47% minority members). Relatedly, Gross and Miller (1997) have argued that the 'Golden Section' (61.8% majority; 38.2% minority) may reflect the point at which, subjectively, majority size is recognized. The range of majority sizes in our studies (73%–92%) clearly satisfies this criterion.
4. Because the alpha for the index of out-group variability was quite low, we also computed three separate analyses; since these analyses showed exactly the same pattern of results, we proceeded to collapse them, as for in-group variability. We also followed the strategy of deleting items to increase the alpha. Correlations between the 'communication' and 'administration' items were substantially higher than between either of them and 'productivity'. We therefore computed analyses using a two-item measure; however, these yielded almost exactly the same results for analysis of variance and simple main effects, and even means. To maintain comparability with Brown and Smith (1989), we therefore retained all three items in our final analyses.
5. The mean ratings on these scales can be used as measures of group evaluation, which we will not discuss in detail, since our focus is on perceived group variability. In Study 1 we found that only women evaluated the in-group more positively than the out-group, an effect that has been reported previously (e.g. Brown & Smith, 1989;

see Eagly & Mladinic, 1994; Lorenzi-Cioldi, 1998), and may reflect social desirability concerns on the part of men. In Study 2 there were no significant effects for this measure. Because all three dimensions were positive, we also analyzed the perceived dispersion data using analysis of covariance (with the mean as covariate) to ensure that our effects were not driven by the tendency to use one end of the scale. However, results were unchanged.

6. In the original scale used by Allmendinger and Hackman (1995), there were also three items measuring satisfaction with 'management'. Since management in British universities is often perceived in terms of the Head of Department (a fellow academic), we dropped these items which might have evoked specific concerns and disrupted the main purpose of the research.
7. We classified staff by seniority on the basis of the distinction drawn in British universities between 'Grade 1' staff (professors, readers and senior lecturers) and lecturers.
8. Given the reliable association between gender and status reported in the preliminary analyses, it might be argued that the findings for impact and status merely reflect the predominance of men among senior staff. However, Study 2 reported that perceived impact and status did vary as a linear function of group proportions, so these measures do tap more than the general association between gender and seniority.
9. Brauer and Judd (2000) have pointed out that, in designs like those used in our research, and almost all studies on perceived variability which have participant and target group factors, there is a statistical confound between the interaction between target group and participant group, and the target group main effect (see also Ryan & Bogart, 1997). Thus the OH effect for men and the IH effect for women that we have reported are also consistent with a main effect of target group. Brauer and Judd discuss a number of methodological strategies to address this problem, including the use of more than two participant groups and target groups. With gender groups, however, this is of course not possible. Theoretically, the two possible effects (a stronger OH effect for men vs. a target group effect) are quite different. On the one hand, perhaps men and women do differ in their tendency to differentiate gender in- and out-groups, an effect that we have shown varies with group proportions. On the other hand, perhaps men tend to be seen as more heterogeneous than women, except when they are in the minority, and women tend to be seen as more homogeneous, except what they are in the majority. Both these effects are consistent with the literature reviewed above, showing (a) that majorities tend to show a greater outgroup homogeneity effect than minorities and (b) that powerful groups tend to be, and to be seen as, more variable than powerless groups. Although we cannot choose between these interpretations, it is important to acknowledge that the two possible effects do mean two different things.
10. We contacted all the departments used in Study 1 and asked for their most recent publication lists. We then computed a 2 (group proportions: male-skewed/male-tilted) × 2 (gender: female/male) × 2 (seniority: Grade 1/lecturers) regression ANOVA on the number of journal articles published by 232 men and 32 women academics. There were no significant main effects or interactions (group proportions, $F = <1$; gender, $F = 1.70$; seniority, $F = <1$; degrees of freedom = 1, 257).

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